AL.1871

Alberta AGRICULTURE

Volume 4 Number 1 September, 1989

Research Report

On-Farm Demonstration projects require the cooperation of farmers, district agriculturists and specialists if they are to be successful. Those cooperating in a recent trial of fababean and field pea production in north central Alberta included: (left to right) Bob Park, provincial supervisor, special crops, Lacombe; Ken Lopetinsky, forage and special crops specialist, Barrhead; Joe St. Denis, farmer, Legal; John Hladky, district agriculturist, Morinville.

Pulses aid farm financial health

On-farm demonstrations yield favourable results

In the mid-1980s, many Alberta crop growers were facing difficult cash and cropping decisions. Export wheat prices fell in response to new levels of world oversupply. The competitive growth in grain price subsidies paid by the United States and the European Common Market made the situation even worse.

One result, says Al Dooley, Alberta Agriculture's special crops marketing analyst, was a search for alternative crops which would answer two needs: generate cash flow and perform well under different types of growing conditions. Pulse crops met both needs.

Well-adapted to the prairie and parkland climates, pulses such as fababeans and field peas can be grown for human consumption and as an alternate protein source for livestock. Pulse crops bring farmers the benefits of improved soil fertility through nitrogen fixation, and increased soil organic matter. They work well in crop rotations. Moreover, they are cash crops and unaffected by quotas.

In Alberta, a lack of local information regarding production practices for pulse crops had, at times, resulted in low yields, delayed maturity, and harvest difficulties. Often, farmers ended up with a poor quality product.

Alberta pulse growers voiced a need for more information on the agronomics of pulse crop production. In 1981, the Pulse Growers Association of Alberta began field trials to determine how best to grow the crops. Trials were conducted primarily in southern Alberta. For this reason, in 1985 the Association's Northern Branch approached Alberta Agriculture for a grant under the Farming for the Future On-Farm Demonstration Program. Within weeks, a study entitled "Agronomics of Fababeans and Field Peas in North Central Alberta" was initiated.

"(One time) my neighbor had some peas he wanted me to try. I only planted half of them and gave the rest away. At harvest, I was amazed with the (good) yields."

In the study's first year, 1985, five plots of fababeans and two plots of field peas were seeded. The following year, one plot of fababeans and five plots of field peas were seeded. (Other projects have since been carried out. To date, more than 25 pulse plots have been evaluated in the northwestern region of Alberta).

In spite of dry weather during the summers and wet harvests, the original Farming for the Future project provided some very useful agronomic information on seeding rates, selection of herbicides, and variety yields. According to Ken Lopetinsky, Alberta Agriculture's forage and special crops specialist at Barrhead, the project participants also

The beauty of aging

New storage techniques increase tuber yield

Earliness versus yield and grade — the tradeoff between these considerations has long been a problem for potato growers in Alberta. The problem is Alberta has a restrictive (too short) growing season. To compensate, producers have often sacrificed yield and grade for earliness. Recent studies suggest this need not be the case.

"An important aspect of the aging technique is the ease with which it can be done. The beauty of it to the industry is that drastic and expensive changes to storage equipment are not necessary."

University of Alberta researcher Dr. Rick Knowles examines potatoes passing through a grading machine.

Research in the United States and Europe indicates that planting physiologically older seed potatoes or seed-tubers may result in higher and/or earlier yields in areas with relatively short growing seasons.

Dr. Rick Knowles, Associate Professor of Plant Science at the University of Alberta, is pursuing this concept of "physiological age" as a factor in improving earliness, grade and yield. With the help of a grant from Alberta Agriculture's Farming for the Future Program, Dr. Knowles and his research team have been investigating the technique of "seed-tuber aging".

Dr. Knowles notes the terms "seed-tuber aging" and "physiological age" refer to the developmental state of the tuber, and its readiness to produce a new plant. By subjecting seed tubers to various temperatures when they are in storage prior to planting, growers can create different physiological ages.

Most growers store seed tubers at approximately 4°C. In his experiments, Dr. Knowles is using elevated storage temperatures at the beginning of storage, followed by lower temperatures toward the end of storage. These temperatures, combined with the number of days in storage at each temperature, are used to calculate accumulated heat-units, or degree-days. Degree-days thus determine physiological age.

Dr. Knowles' research, which began in 1987, involves modelling the development

Pulses

continued from page 1

became better acquainted with the demonstration process and data collection methods.

The study produced valuable local agronomic information. Fababean test plots comparing three different seeding rates showed a significant yield increase at the higher rates. Plots seeded at 200 lbs/acre had an average yield of 3028 lbs/acre, an increase of 56% over those plots seeded at 100 lbs/acre. Fababean variety trials showed little difference in yields among varieties.

Some of the most useful information collected in the fababean trials concerned the use of herbicides. Project results showed little variation in effective weed control among the types of herbicides tested. Accordingly, notes Mr. Lopetinsky, producers should base their herbicide decisions on other factors: the types of weeds present, whether the farmer prefers pre-plant or post emergent types,and the cost of the herbicide. In addition, he says, when choosing herbicides, farmers should be aware of the possible harmful effects of herbicide residues in their crop rotation.

Other project results were more definitive. Data collected in field pea trials indicated that English Wrinkle pea varieties grown in northcentral Alberta have higher yield potentials. (The average yield of the English varieties was 1,000 lbs/acre more than the average yield of traditional varieties such as Century, Tara and Trapper).

Adding nitrogen fertilizer to the field pea plots did not increase yields. A producer involved in many pulse crop demonstrations, Joe St. Denis of Legal, says that if peas are properly inoculated with *Rhizobium* bacteria, the use of nitrogen fertilizer is unnecessary.

Mr. St. Denis is a self-admitted convert to field peas. "(One time) my neighbor had some peas he wanted me to try. I was very reluctant. I only planted half of them and gave the rest away. At harvest, I was amazed with the (good) yield." Since then, Mr. St. Denis's interest in pulse crops has continued to grow.

In addition to ongoing trials in northcentral Alberta, Farming for the Future is currently funding two field pea projects in central and northeastern Alberta. These projects are testing 10 field pea varieties and will provide producers with information regarding the varieties best adapted to their areas. The testing will be done at seven sites from Coronation to Rocky Mountain House in the central region, and three sites (Ryley, St. Paul, and Vegreville) in the northeastern region. Lacombe district agriculturist, Neil Miller, is coordinating the project for the Central Alberta Branch of the Pulse Growers Association of Alberta.

"The key to the success of an On-Farm Demonstration project like this is cooperation," Mr. Lopetinsky says. "We have always had complete cooperation from our department and the producers. We get a lot of support from the district agriculturists as well as from chemical companies.

"In the long run," he states, "demonstrations become less expensive because of the excellent involvement of industry and our long-term cooperating farmers. That is the benefit of working through an association like the Pulse Growers."

Research Report *is published by the Research Division of Alberta Agriculture. Permission to reproduce articles contained in* ***Research Report*** *is granted provided appropriate credit is given to the source. Any comments or requests regarding this publication should be directed to: Editor,* ***Research Report,*** *Research Division, Alberta Agriculture, 7000 - 113 Street, Edmonton, Alberta, T6H 5T6.*

CANADIANA

SEP 25 1990

and yields of plants grown from five ages of seed tubers. Trials are conducted in both controlled environment facilities and the field. In all trials, plants grown from physiologically older seed tubers have emerged sooner and have established a greater leaf area and subsequent tuber set earlier in the season. The earlier the harvest, the more pronounced the yield and grade advantage resulting from use of the physiologically older seed tubers.

Dr. Knowles notes an important finding: the maximum age-related yield response has resulted from tubers with an approximate age of 700 degree-days. In his experiments, these tubers are effectively "middle-aged". Older seed-tubers (approximately 1200 degree-days) have usually produced lower yields.

"While differences in yield between treatments apparent at early harvests (90 days and 105 days) are also present at the main-crop harvest, they are not as pronounced," he says. "The greatest yield advantage of tuber aging occurs at early harvests, so the technique is best suited to short growing-season areas."

At 90 and 105 days after planting, aging treatments have resulted in higher yields of mature Canada No. 1 grade tubers. Furthermore, the starch content of the tubers (a measure of processing quality) is not compromised by the early harvests.

According to Dr. Knowles, these results suggest a change is needed in the way of thinking regarding storage management. He recommends that rather than choosing a storage temperature which would encourage minimal physiological change in the seed-tuber, a grower should choose a temperature which would positively influence subsequent growth, development and yield of the crop.

"An important aspect of the aging technique is the ease with which it can be done," says the university researcher. "The process is simply that of manipulating the natural life cycle of the tuber. The beauty of it to the industry is that drastic and expensive changes to storage equipment are not necessary."

Dr. Knowles believes that results from this project will advance the understanding of potato physiology at the whole-plant level and could eventually lead to published standards for the handling and storage of certified seed potatoes. He suggests the potential economic benefit to the Alberta potato industry would be an increase in excess of 35% of the current value of the 'Russet Burbank' crop, and an increase of anywhere from 57% to 80% of the current value of the 'Carlton' crop.

According to Dr. Knowles, there are at least two distinct advantages to using aged seed tubers for production: "Not only can both yield and grade be improved, but earlier harvests are possible without foregoing yield. This should help growers cash in on the lucrative early market."

FARMING FOR THE FUTURE

by John Tackaberry
Regional Director, Northwest Region, Alberta Agriculture

Since its inception in 1982, Farming for the Future's On-Farm Demonstration Program has awarded funding of $2.6 million to about 500 projects. These projects have occurred in virtually every area of the province and have covered the full spectrum of agriculture. Without the program, the vast majority of these demonstrations would not have materialized. The missed opportunities to transfer some significant information would have been immense.

One of the main reasons for the On-Farm Demonstration Program's success has been the degree to which extension workers, researchers, producers and agribusiness have worked together. Experience has shown that the most successful projects are usually those with active participation from a range of people — commitment is highest, exposure is greatest and follow through is best.

A classic example of this type of cooperative venture resulted in one of the projects identified in this issue of Research Report. The project entitled "Agronomics of Field Peas in North Central Alberta" had a number of key partners.

First, there was the cooperator, in this case the Northern Branch of the Alberta Pulse Growers' Association. This producer group has a regional membership of nearly 200 farmers. All of the various sub-projects occurred on members' farms.

Second, there were the regional specialists and district extension staff. In this particular project, district agriculturists from Barrhead, Morinville, Stony Plain and Westlock participated. Some line division staff were involved from Alberta Agriculture's Plant Industry and Animal Industry Divisions. These people helped in project design and statistical analysis.

The third group consisted of various seed and chemical companies which assisted with sponsorship and, in some cases, offered technical support.

In total, this project required a considerable amount of coordination, cooperation and team effort, but the results speak for themselves. Several hundred farmers received direct exposure to field pea production, through organized tours to the various sub-projects throughout the region. Producers came from many areas of Alberta, and some from as far as Saskatchewan and British Columbia.

A very significant benefit of the field pea project was the amount of statistically valid agronomic data obtained. This data, plus information gained in a similar project conducted the year before, provided the framework for a major production manual on field peas. Since its release, nearly 3,000 copies of the manual have been sent to farmers and extension personnel throughout the province.

In times of tight budgets and economic restraint, one always wonders about the "cost/benefit" of every program. As concerned taxpayers we all want to ensure that we are getting the best value for our money. In this regard, the On-Farm Demonstration Program comes out squeaky clean.

For the most part, the program funds only those materials and supplies that are above and beyond normal production inputs. Any specialized equipment that may be required is generally rented, as opposed to purchased. Only labor that is in addition to normal production requirements is funded. By utilizing the producer's equipment and land the requirements for capital funding are negligible.

In short, by having everybody pitch in and make a contribution in their own way, the program is able to maximize the benefits from the dollars allocated. Everybody wins!

Making sense out of abstracts

New agricultural research database/BBS being tested

Technology, it seems, eventually overtakes everyone — even those in agricultural research!

Using a combination of new and old communications tools, Alberta Agriculture's Research Division is testing a system which will provide summaries of the results of hundreds of agricultural research projects to anyone with a computer, a telephone and a modem. (Note: A modem is a device which allows a computer to communicate over a telephone line.)

The project is called the Ag-Research BBS. BBS's or electronic Bulletin Board Systems have been around for a number of years. Their use, however, has generally been restricted to distributing messages and to serving as electronic warehouses from which users could download software. Expanding on this, the Research Division has designed its BBS to allow access to a newly created database, which consists of the abstracts of all research projects funded under the Farming for the Future Program since it first began in the late 1970s.

The average search time for a popular word like 'wheat' is about 3.4 seconds. Others may be as little as two seconds.

Nearly 500 abstracts are included in the database, which permits callers quick and flexible keyword searches. New software was especially developed for long-distance callers to avoid the long waits which can often occur in a database search.

The average search time for a popular word like 'wheat' is about 3.4 seconds. Other searches may take as little as two seconds. Up to 20 keywords can be entered to allow users to narrow the search to a very few abstracts.

In addition, several alternate words can be attached to each keyword to expand the search. For instance: if the first keyword is 'wheat' and the second keyword is 'disease', then the system will find the abstracts which discuss both 'wheat' and 'disease'.

However, by allowing alternate keywords, such as 'grain' and 'cereal' to be attached to 'wheat', the system will find any abstract which contains the words 'wheat' and/or 'grain' and/or 'cereal', plus the word 'disease'. Similarly, 'disease' can be expanded to include related terms like 'pest' or 'insect' or 'sick'. As a result, the search would find abstracts which discuss 'wheat' (or its alternates) and 'disease' (or its alternates).

"The software works very well," says Dr. Ralph Christian, executive director of the research division, "but the overall system is still a little rough in places. We are just starting to construct the 'help' features, which are needed to make the system as user friendly as possible. That is one of our most important goals."

In addition to the 500 abstracts now on-line, the division expects to add an additional 500 references to projects which are still underway or have not been fully completed. Each abstract is also being updated with the name, address and phone number of the researcher who conducted the project.

"Having someone to contact about any given project is very important," says Dr. Christian. "Researchers or extension specialists are likely to have the best information about a particular problem. As well, our division is not really set up to provide callers (farmers, D.A.s, scientists, etc.) with support on individual projects. We hope to do much more in this area in the future; however, we have our hands full just administering the programs we have."

Alberta Agriculture's Research Division has compiled a database of results from research projects conducted under the Farming for the Future Program. Any properly equipped computer can dial-up "The Ag-Research BBS" at (403) 438-2207. The system operates 24 hours per day.

The experimental BBS will be tested for several months to judge reaction, acceptance and problems.

"It would be fair to say this is an experiment," says the research division director. "We would appreciate any feedback on this idea. I certainly invite anyone who is interested to call the Ag-Research BBS and see if it can offer them any assistance."

If the project is successful, the BBS's database would be expanded to offer articles, selected fact sheets, and other items. All would be available for download, which callers could then print out in their homes and offices.

The AG-RESEARCH BBS is available 24 hours a day at (403) 438-2209. All abstracts can be downloaded individually, or grouped by commodity. Since the BBS is still under development, callers may occasionally find the system is off-line for additions to the database and to implement new features.

"As a general rule, if a call is not answered by the third ring, the system is not available," says system operator (sysop) Kent Racher. "However, we certainly want people to call again. We shouldn't be down for long."